IN THE CLAIMS

Please amend the claim as follows:

1. (Currently Amended) An Ethernet-PON (Passive Optical Network) for integrating broadcast and communication based on a TDM (Time Division Multiplexing) scheme, comprising:

an OLT (Optical Line Terminal) configured (i) to perform a switching operation on a plurality of digital broadcast/image data received from an external broadcast provider according to respective broadcast/image selection information transmitted from users, (ii) to perform a time division multiplexing on the digital broadcast/image data to convert the digital broadcast/image data into a broadcast/image signal, (iii) to perform a frame-multiplexing on the broadcast/image signal and communication data received through an IP (Internet Protocol) network into a single frame, (iv) to electro-optically convert the single frame, and (v) to transmit the electro-optically converted signal;

a plurality of ONTs (Optical Network Terminals), each ONT adapted to receive an optical signal from the OLT, the ONT configured to photoelectrically convert the received optical signal, to perform a frame & time-slot demultiplexing on the ~~photoelectriaelly~~ photoelectrically converted signal, to output the communication data and the selected broadcast/image data included in the ~~photoelectriaelly~~ photoelectrically converted signal to a corresponding user, and to receive a communication signal and the broadcast/image selection information from one of the users to output them to the OLT; and

an optical splitter arranged in a path between the OLT and the plurality of ONTs, said optical splitter splitting a signal from the OLT into the plurality of ONTs, coupling signals from the plurality of ONTs, and transmitting the coupled signal to the OLT;

wherein the OLT includes frame multiplexing means for time division multiplexing a communication signal retrieved from a time-slot matching buffer and a broadcast/image signal in a single frame, and a first optical transmitter configured to optically modulate an output from the frame multiplexing means.

2. (Currently Amended) ~~The Ethernet PON according to claim 1,~~ An Ethernet-PON (Passive Optical Network) for integrating broadcast and communication based on a TDM (Time Division Multiplexing) scheme,

an OLT (Optical Line Terminal) configured (i) to perform a switching operation on a plurality of digital broadcast/image data received from an external broadcast provider according to respective broadcast/image selection information transmitted from users, (ii) to perform a time division multiplexing on the digital broadcast/image data to convert the digital broadcast/image data into a broadcast/image signal, (iii) to perform a frame-multiplexing on the broadcast/image signal and communication data received through an IP (Internet Protocol) network into a single frame, (iv) to electro-optically convert the single frame, and (v) to transmit the electro-optically converted signal;

a plurality of ONTs (Optical Network Terminals), each ONT adapted to receive an optical signal from the OLT, the ONT configured to photoelectrically convert the received optical signal, to perform a frame & time-slot demultiplexing on the photoelectrically converted signal, to output the communication data and the selected broadcast/image data included in the photoelectrically converted signal to a corresponding user, and to receive a communication signal and the broadcast/image selection information from one of the users to output them to the OLT; and

an optical splitter arranged in a path between the OLT and the plurality of ONTs, said

optical splitter splitting a signal from the OLT into the plurality of ONTs, coupling signals from the plurality of ONTs, and transmitting the coupled signal to the OLT; and

wherein the OLT includes:

a broadcast/image channel selection switch configured to receive and switching external MPEG (Motion Picture Experts Group) broadcast and image data,

a broadcast/image time-slot multiplexer configured to assign broadcast/image channels, output from the broadcast/image channel selection switch, to a time-slot assigned to each user so as to multiplex the channels;

an Ethernet-PON OLT function processor configured to perform Ethernet-PON OLT functions;

an IP router configured to route a communication signal to an upper level IP network or to the Ethernet-PON OLT function processor;

an Ethernet time-slot matching buffer configured to store the communication data from the Ethernet-PON OLT function processor that is transmitted to the OLT and to prepare the communication data to be frame multiplexed;

a frame multiplexer configured to multiplex the time-slot-multiplexed broadcast/image signal from the broadcast/image time-slot multiplexer and the communication signal stored in the Ethernet time-slot matching buffer into a single frame;

a first optical transmitter configured to optically modulate a frame-multiplexed signal outputted from the frame multiplexer, and transmitting the modulated signal as an optical signal of λ_{DOWN}; and

a first optical receiver configured to receive an optical signal from the ONTs and converting the optical signal into an electrical signal.

3. (Previously Presented) The Ethernet-PON according to claim 1, wherein each of the plurality of ONTs includes:

a second optical receiver configured to receive the signal transmitted as the optical signal of λ_{DOWN} from the OLT, and photoelectrically converting the optical signal;

a second optical transmitter configured to electro-optically convert upstream data and transmitting the upstream data to the OLT;

a frame/time-slot demultiplexer configured to separate the frame/time-slot-multiplexed broadcast/image and communication signals;

an Ethernet-PON ONT function processor configured to receive the communication signal from the frame/time-slot demultiplexer and to perform ONT functions; and

a broadcast/image adapter configured to recover a time-slot-format broadcast/image signal, separated by the frame/time-slot demultiplexer, into an original signal.

4. (Previously Presented) The Ethernet-PON according to claim 2, wherein each of the plurality of ONTs includes:

a second optical receiver configured to receive the signal transmitted as the optical signal of λ_{DOWN} from the OLT, and photoelectrically converting the optical signal;

a second optical transmitter configured to electro-optically convert upstream data and transmitting the upstream data to the OLT;

a frame/time-slot demultiplexer configured to separate the frame/time-slot-multiplexed broadcast/image and communication signals;

an Ethernet-PON ONT function processor configured to receive the communication signal from the frame/time-slot demultiplexer and to perform ONT functions; and

a broadcast/image adapter configured to recover a time-slot-format broadcast/image signal, separated by the frame/time-slot demultiplexer, into an original signal.

5. (Previously Presented) The Ethernet-PON according to claim 1, wherein the single frame obtained by multiplexing the broadcast/image signal and the communication signal is divided into a predetermined number of time-slots, and each of the time-slots includes a broadcast/image sub-time-slot containing a broadcast/image signal and an Ethernet sub-time-slot containing a communication signal.

6. (Previously Presented) The Ethernet-PON according to claim 2, wherein the single frame obtained by multiplexing the broadcast/image signal and the communication signal is divided into a predetermined number of time-slots, and each of the time-slots includes a broadcast/image sub-time-slot containing a broadcast/image signal and an Ethernet sub-time-slot containing a communication signal.

7. (Previously Presented) The Ethernet-PON according to claim 6, wherein the broadcast/image sub-time-slot contains a broadcast/image signal selected by one of the ONTs corresponding to said time-slot's order, and said time-slot being left empty if there is no broadcast/image signal selected by the ONT.

8. (Previously Presented) The Ethernet-PON according to claim 6, wherein the Ethernet sub-time-slot contains communication data of every ONT.

9. (Previously Presented) The Ethernet-PON according to claim 1, wherein the single frame obtained by multiplexing the broadcast/image signal and the communication signal is divided into a sub-frame for broadcast/image signals and a sub-frame for Ethernet communication signals, the sub-frame for broadcast/image signals including broadcast/image time-slots that contain broadcast/image signals of the ONTs.

10. (Previously Presented) The Ethernet-PON according to claim 2, wherein the single frame obtained by multiplexing the broadcast/image signal and the communication signal is divided into a sub-frame for broadcast/image signals and a sub-frame for Ethernet communication signals, the sub-frame for broadcast/image signals including broadcast/image time-slots that contain broadcast/image signals of the ONTs.

11. (Previously Presented) The Ethernet-PON according to claim 9, wherein the broadcast/image time-slot contains a broadcast/image signal selected by one of the ONTs corresponding to said time-slot's order, said time-slot being left empty if there is no broadcast/image signal selected by the ONT.

12. (Previously Presented) The Ethernet-PON according to claim 9, wherein the sub-frame for Ethernet communication signals contains communication data of every ONT.

13. (Currently Amended) An Ethernet-PON for integrating broadcast and communication based on a TDM scheme, comprising:

an OLT configured (i) to perform a switching operation on a plurality of digital broadcast/image data received from an external broadcast provider according to broadcast/image

selection information transmitted from users; (ii) to perform a time division multiplexing on the digital broadcast/image data to convert the digital broadcast/image data into a broadcast/image signal; (iii) to electro-optically convert the broadcast/image signal into a broadcast/image optical signal of λ_B; (iv) to electro-optically convert communication data received from an IP network into a communication optical signal of λ_{DOWN}; (v) to couple the broadcast/image optical signal of λ_B and the communication optical signal of λ_{DOWN} into a single optical signal; and (vi) to transmit the single optical signal;

a plurality of ONTs, each ONT configured to receive an optical signal from the OLT; to separate the received optical signal into the broadcast/image optical signal of λ_B and the communication optical signal of λ_{DOWN}; to photoelectrically convert the two separated signals; to perform time division demultiplexing on the photoelectrically converted broadcast/image signal to convert the photoelectrically converted broadcast/image signal into the broadcast/image data; to output the broadcast/image data and the photoelectrically converted communication signal to a corresponding user; and to receive a communication signal and the broadcast/image selection information from the user to output them to the OLT; and

an optical splitter configured to split a signal from the OLT into the plurality of ONTs, coupling signals from the plurality of ONTs, and transmitting the coupled signal to the OLT;

a broadcast/image channel selection controller configured to receive the broadcast/image selection information from the plurality of ONTs through the Ethernet-PON OLT function processor, and transferring a control signal to the broadcast/image channel selection switch to allow the broadcast/image channel selection switch to select broadcast/image channels corresponding respectively to the plurality of ONTs; and

a first WDM coupler configured to couple the optically modulated communication signal

of λ_{DOWN} and the optically modulated broadcast/image signal of λ_B, and to output the coupled signal.

14. (Currently Amended) ~~The Ethernet-PON according to claim 13~~An Ethernet-PON for integrating broadcast and communication based on a TDM scheme, comprising:

an OLT configured (i) to perform a switching operation on a plurality of digital broadcast/image data received from an external broadcast provider according to broadcast/image selection information transmitted from users; (ii) to perform a time division multiplexing on the digital broadcast/image data to convert the digital broadcast/image data into a broadcast/image signal; (iii) to electro-optically convert the broadcast/image signal into a broadcast/image optical signal of λ_B; (iv) to electro-optically convert communication data received from an IP network into a communication optical signal of λ_{DOWN}; (v) to couple the broadcast/image optical signal of λ_B and the communication optical signal of λ_{DOWN} into a single optical signal; and (vi) to transmit the single optical signal;

a plurality of ONTs, each ONT configured to receive an optical signal from the OLT; to separate the received optical signal into the broadcast/image optical signal of λ_B and the communication optical signal of λ_{DOWN}; to photoelectrically convert the two separated signals; to perform time division demultiplexing on the photoelectrically converted broadcast/image signal to convert the photoelectrically converted broadcast/image signal into the broadcast/image data; to output the broadcast/image data and the photoelectrically converted communication signal to a corresponding user; and to receive a communication signal and the broadcast/image selection information from the user to output them to the OLT; and

an optical splitter configured to split a signal from the OLT into the plurality of ONTs,

coupling signals from the plurality of ONTs, and transmitting the coupled signal to the OLT, wherein the OLT includes:

a broadcast/image channel selection switch configured to receive, to switch and to ~~outputg~~ output an external MPEG broadcast and image data;

a time division multiplexer configured to assign broadcast/image channels output from the broadcast/image channel selection switch to time-slots assigned respectively to the users, so as to multiplex the channels in a TDM scheme;

a first optical transmitter configured to optically modulate the time-division-multiplexed broadcast/image signal;

an Ethernet-PON OLT function processor configured to perform Ethernet-PON OLT functions;

an IP router configured to route communication data to an upper level IP network or to the Ethernet-PON OLT function processor;

a second optical transmitter configured to optically modulate communication data to be transmitted to the plurality of ONTs;

a first optical receiver configured to receive an optical signal from the plurality of ONTs, converting the optical signal into an electrical signal, and transferring the converted signal to the Ethernet-PON OLT function processor;

a broadcast/image channel selection controller configured to receive the broadcast/image selection information from the plurality of ONTs through the Ethernet-PON OLT function processor, and transferring a control signal to the broadcast/image channel selection switch to allow the broadcast/image channel selection switch to select broadcast/image channels corresponding respectively to the plurality of ONTs; and

a first WDM coupler configured to couple the optically modulated communication signal of λ_{DOWN} and the optically modulated broadcast/image signal of λ_B, and to output the coupled signal.

15. (Currently Amended) The Ethernet-PON according to claim 13, wherein each of the plurality of ONTs includes:

a second WDM coupler configured to separate an optical signal received from the OLT into a communication signal of λ_{DOWN} and a broadcast/image signal of λ_B;

a second optical receiver configured to receive the separated communication signal of λ_{DOWN}, and converting the communication signal into an electrical signal;

a third optical receiver configured to receive the separated broadcast/image signal of λ_B, and converting the separated broadcast/image signal into an electrical signal;

an Ethernet-PON ONT function processor, connected to the second optical receiver, configured to perform ONT functions;

a third optical transmitter configured to receive broadcast/image selection information and a communication signal to be transmitted to the OLT from a corresponding user through the Ethernet-PON ONT function processor, and transmitting them as an optical signal λ_{UP}; and

a time division demultiplexer & broadcast/image adapter configured to receive the broadcast/image signal converted into the electrical signal, performing time division demultiplexing on the received signal, and recovering a time-slot-format broadcast/image signal, obtained through the time division demultiplexing, into an original signal.

16. (Previously Presented) The Ethernet-PON according to claim 13, wherein the time-

division-multiplexed broadcast/image signal includes time-slots for broadcast/image signals corresponding respectively to the plurality of ONTs, each of the time-slots including a predetermined number of sub-time-slots for accommodating the same predetermined number of broadcast/image signals.

17. (Previously Presented) The Ethernet-PON according to claim 14, wherein the time-division-multiplexed broadcast/image signal includes time-slots for broadcast/image signals corresponding respectively to the plurality of ONTs, each of the time-slots including a predetermined number of sub-time-slots for accommodating the same predetermined number of broadcast/image signals.

18. (Previously Presented) The Ethernet-PON according to claim 6, wherein the broadcast/image time-slot contains a broadcast/image signal selected by one of the ONTs corresponding to said time-slot's order, said time-slot being filled with null data if there is no broadcast/image signal selected by the ONT.

19. (Previously Presented) The Ethernet-PON according to claim 9, wherein the broadcast/image sub-time-slot contains a broadcast/image signal selected by one of the ONTs corresponding to said time-slot's order, and said time-slot being filled with null data if there is no broadcast/image signal selected by the ONT.

20. (Previously Presented) The Ethernet-PON according to claim 1, wherein the switching operation, which the OLT is configured to perform, comprises selecting a broadcast/image data channels from a plurality of broadcast/image channels, which received

from an external broadcast provider, according to the broadcast/image selection information transmitted from each user.

21. (Previously Presented) The Ethernet-PON according to claim 13, wherein the switching operation, which the OLT is configured to perform, comprises selecting a broadcast/image data channels from a plurality of broadcast/image channels, which received from an external broadcast provider, according to the broadcast/image selection information transmitted from each user.

22. (New) An OLT (Optical Line Terminal) of an Ethernet-PON for integrating broadcast and communication based on a TDM for transmission to one or more users, said OLT (Optical Line Terminal) being configured: (i) to perform a switching operation on a plurality of digital broadcast/image data received from an external broadcast provider according to respective broadcast/image selection information transmitted from users, (ii) to perform a time division multiplexing on the digital broadcast/image data to convert the digital broadcast/image data into a broadcast/image signal, (iii) to perform a frame-multiplexing on the broadcast/image signal and communication data received through an IP (Internet Protocol) network into a single frame, (iv) to electro-optically convert the single frame, and (v) to transmit the electro-optically converted signal, wherein said OLT comprises:

a broadcast/image channel selection switch configured to receive and switching external broadcast and image data,

a broadcast/image time-slot multiplexer configured to assign broadcast/image channels, output from the broadcast/image channel selection switch, to a time-slot assigned to each user so as to multiplex the channels;

an Ethernet-PON OLT function processor configured to perform Ethernet-PON OLT functions;

an IP router configured to route a communication signal to an upper level IP network or to the Ethernet-PON OLT function processor;

an Ethernet time-slot matching buffer configured to store the communication data from the Ethernet-PON OLT function processor that is transmitted to the OLT and to prepare the communication data to be frame multiplexed;

a frame multiplexer configured to multiplex the time-slot-multiplexed broadcast/image signal from the broadcast/image time-slot multiplexer and the communication signal stored in the Ethernet time-slot matching buffer into a single frame;

a first optical transmitter configured to optically modulate a frame-multiplexed signal outputted from the frame multiplexer, and transmitting the modulated signal as an optical signal of λ_{DOWN}; and

a first optical receiver configured to receive an optical signal from the users via one or more ONTs (Optical Network Terminals) and converting the optical signal into an electrical signal.